



Remarks

Applicants request that the present patent application be reconsidered in view of the above amendments and following remarks. Claims 3, 6, 7 and 10 have been amended and claims 5 and 12 have been cancelled. No claims have been added. Therefore, claims 3, 4, 6, 7, 10, 11 and 13-16 are pending in the application.

Claims 3-7, 10-12 and 14-16 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 5 and 12 have been cancelled, therefore the rejection of these claims is moot. Claims 3, 6, 7 and 10 have been amended to state that the armature includes an outer surface, wherein at least a portion of the outer surface is frusto-conical. See FIG. 2. Thus, Applicants request that the rejection of claims 3, 4, 6, 7, 10, 11 and 14-16 be withdrawn.

Claims 5 and 12 also were rejected because the term "nearly identical as possible" renders the claims indefinite. As stated above, claims 5 and 12 have been cancelled, therefore the rejection of these claims is moot.

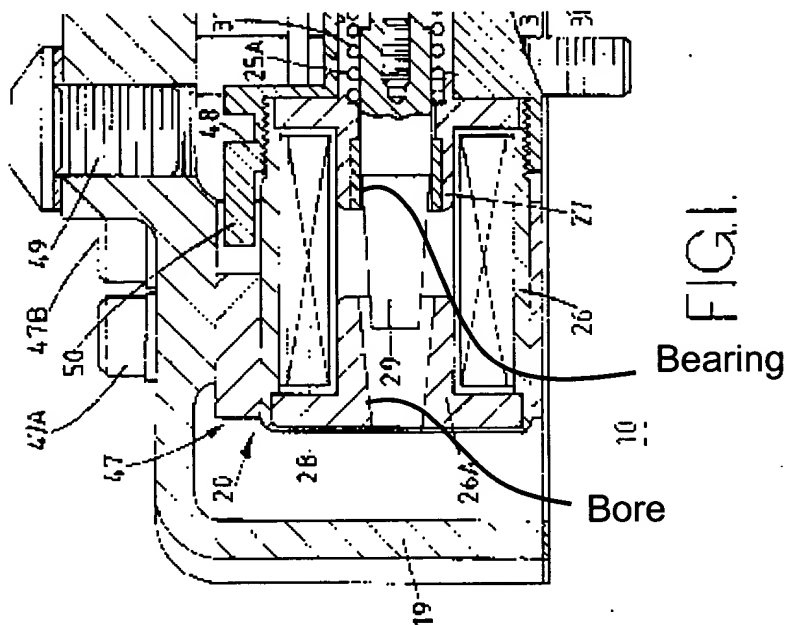
Claims 3-5, 10, 11 and 12 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,313,726 to Golovatai-Schmidt et al. ("the Golovatai reference") in view of U.S. Patent No. 4,873,959 to Law et al. ("the Law reference"). Claims 5 and 12 have been cancelled, therefore the

rejection to these claims is moot. Applicants respectfully traverse the rejection of the remaining claims.

Amended claim 3 is directed to a solenoid for providing linear actuation. The solenoid including first and second polepieces having axial bores coaxially disposed along a common axis, an electrical conductor wound about the polepieces in a plurality of turns, and an armature movably disposed in the axial bores. The armature includes an outer surface, wherein at least a portion of the outer surface is frusto-conical. The frusto-conical portion of the outer surface is adjacent to a substantial portion of the first and second polepieces. The solenoid also includes a bearing axially retained in one of the first and second polepieces, wherein the axial bore of the polepiece not retaining the bearing is non-frusto-conical. A shaft is attached coaxially to the armature and extends through a supportive bore in the bearing wherein the bearing radially supports the shaft. The shaft is axially displaceable by electromagnetic displacement of the armature to provide the actuation, wherein the armature is entirely separated from the axial bores of the polepieces by an air gap, and wherein the armature is prevented from contacting the polepieces.

The Golovatai and Law references taken alone or in combination do not teach or suggest all of the limitations included in amended claim 3. In rejecting claim 3, the Examiner recognized that the Golovatai reference does not disclose an armature having a frusto-conical section that is adjacent to a substantial portion of the first and second polepieces. *See Office Action* dated February 24, 2005, pg. 2. In order to teach this particular feature, the Law reference was

combined with the Golovatai reference since it includes a tapered armature (29). However, the armature (29) in the Law reference operates to seat directly against the surface of the bore formed in the polepiece (26A) as the shaft (30) slides within a bearing (B2) to a closed position. A portion of Figure 1 from the Law reference is set forth below:



The bearing is retained by the upper polepiece (27), therefore the bore formed in the polepiece that is not retaining the bearing is defined in the polepiece identified with reference numeral 26A. The bore in polepiece (26A) is frusto-conical and therefore does not disclose all of the limitations included in amended claim 3.

Moreover, when the armature (29) in the Law reference is in the closed position, the armature (29) will seat directly on the surface of the bore formed in the polepiece (26A) since the tapered shape of the armature (29) is matched with

the frusto-conical portion of the bore formed in the polepiece (26A). Since the armature (29) is seated in the bore of the polepiece (26A), the Law reference fails to teach or suggest an armature that is entirely separated from the axial bores of the polepieces by an air gap, wherein the armature is prevented from contacting the polepieces as recited in claim 3.

For at least the aforementioned reasons, Applicants request that the rejection of claim 3 be withdrawn. As claim 4 depends from claim 3, Applicants request that the rejection of claim 4 be withdrawn for at least the same reasons set forth with respect to claim 3.

As stated above with respect to claim 3, the Golovatai and Law references do not teach or suggest an axial bore of the polepiece not retaining the bearing being non-frusto-conical, and an armature that is entirely separated from the axial bores of the polepieces by an air gap, wherein the armature is prevented from contacting the polepieces as recited in claim 10. For at least the same reasons set forth with respect to claim 3, Applicants submit that the references of record do not teach or suggest all of the limitations included in claim 10. As claim 11 depends from claim 10, Applicants request that the rejection of claim 11 be withdrawn for at least the same reasons set forth with respect to claim 10.

Claims 6 and 7 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Golovatai and Law references in view of U.S. Patent No. 5,947,092 to Hussy et al. ("the Hussy reference").

As stated above with respect to claim 1, the Golovatai and Law references do not teach or suggest an axial bore of the polepiece not retaining the bearing being non-frusto-conical, and an armature that is entirely separated from the axial bores of the polepieces by an air gap, wherein the armature is prevented from contacting the polepieces as recited in claims 6 and 7. The device disclosed in the Hussy reference also fails to teach or suggest these particular limitations that were lacking in the Golovatai and Law references. For at least the same reasons set forth with respect to claim 1, Applicants request that the rejection of claims 6 and 7 be withdrawn.

Claims 13 and 16 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Golovatai and Law references in view of U.S. Patent No. 4,729,252 to Huber et al. ("the Huber reference").

Claim 13 is directed to a solenoid for providing linear actuation including first and second polepieces having axial bores coaxially disposed along a common axis, an electrical conductor wound about the polepieces in a plurality of turns, and an armature movably disposed in the axial bores. The solenoid also includes a bearing axially retained in one of the first and second polepieces, and a shaft attached coaxially to the armature and extending through a supportive bore in the bearing wherein the bearing radially supports the shaft. The shaft is axially displaceable by electromagnetic displacement of the armature to provide the actuation. The armature is entirely separated from the axial bores of the polepieces by a generally cylindrical air gap, and wherein the bearing has an axial length that is at least 1.5 times larger than the diameter of the shaft.

In rejecting claim 13, the Examiner recognized that the Golovatai and Law references do not disclose the use of a bearing that is at least 1.5 times larger than the diameter of the shaft. See *Office Action*, pg. 3. As such, the Huber reference was combined with the Golovatai and Law references to teach this particular feature. See *id.* The Huber reference is directed to a pinion gear (5) mounted to a shaft (4) that is positioned within a bearing (8). See *Huber*, FIG. 1; Col. 3, lines 9-15. The pinion gear (5) rotates within the bearing (8) as a result of its operational association with the drive shaft (6) and the bevel gear (7). See *id.* Therefore, the bearing (8) is designed for accommodating rotational movement of the shaft (4), not longitudinal movement of the shaft as is the case in the devices set forth in the Golovatai and Law references. Since the motivation for the bearing (8) configuration set forth in the Huber reference is not in line with the operation of the bearings included in the Golovatai and Law references, Applicants submit that there has been no specific evidence provided from the prior art to show that one skilled in the art would have been motivated to use the bearing in the Huber reference with the devices in the Golovatai and Law references to arrive at the invention set forth in claim 13. For at least this reason, Applicants submit that a prima facie case of obviousness has not been established and request that the rejection of claim 13 be withdrawn.

Furthermore, for reasons similar to those set forth above with respect to claim 3, the combination of the Golovatai and Law references fail to teach or suggest an armature that is entirely separated from the axial bores of the polepieces by an air gap as recited in claim 13. The Huber reference also fails to

teach this particular limitation, therefore Applicants request that the rejection of claim 13 be withdrawn for this additional reason.

Claim 16 is not taught or suggested by the Golovatai, Law and Huber references for at least the same reasons set forth above with respect to claim 13. Furthermore, claim 16 depends from claim 10 and therefore includes all of the limitations included in claim 10. As previously stated, the Golovatai and Law references do not teach or suggest an axial bore of the polepiece not retaining the bearing being non-frusto-conical, and an armature that is entirely separated from the axial bores of the polepieces by an air gap, wherein the armature is prevented from contacting the polepieces as recited in claim 10. The device disclosed in the Huber reference also fails to teach or suggest these particular limitations that were lacking in the Golovatai and Law references. As claim 16 depends from claim 10, claim 16 is not taught or suggested by the Golovatai, Law, and Huber references for at least the same reasons set forth with respect to claim 10. Applicants request that the rejection of claim 16 be withdrawn for this additional reason.

Claims 14 and 15 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Golovatai and Law references in view of the Hussy reference.

Claims 14 and 15 depend from claims 6 and 7, respectively, and state that the bearing has an axial length that is at least 1.5 times larger than the diameter of the shaft. As previously stated, the Golovatai and Law references do not

teach or suggest an axial bore of the polepiece not retaining the bearing being non-frusto-conical, and an armature that is entirely separated from the axial bores of the polepieces by an air gap, wherein the armature is prevented from contacting the polepieces as recited in claims 6 and 7. The device disclosed in the Hussy reference also fails to teach or suggest these particular limitations that were lacking in the Golovatai and Law references. As claims 14 and 15 depend from claims 6 and 7, respectively, claims 14 and 15 are not taught or suggested by the Golovatai, Law, and Hussy references for at least the same reasons set forth with respect to claims 6 and 7. Applicants request that the rejection of claims 15 and 16 be withdrawn.

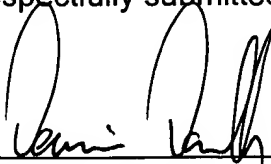
Conclusion

In light of the foregoing, Applicants submit that claims 3, 4, 6, 7, 10, 11 and 13-16 are in condition for allowance and such allowance is respectfully requested. Should the Examiner feel that any unresolved issues remain in this case, the undersigned may be contacted at the telephone number listed below to arrange for an issue resolving conference.

Applicants do not believe that any fee is due at this time. However, the Commissioner is hereby authorized to charge any fee that may have been overlooked to Deposit Account No. 10-0223.

Dated: 5/24/05

Respectfully submitted,



Dennis B. Danella
Reg. No. 46,653

teach or suggest an axial bore of the polepiece not retaining the bearing being non-frusto-conical, and an armature that is entirely separated from the axial bores of the polepieces by an air gap, wherein the armature is prevented from contacting the polepieces as recited in claims 6 and 7. The device disclosed in the Hussy reference also fails to teach or suggest these particular limitations that were lacking in the Golovatai and Law references. As claims 14 and 15 depend from claims 6 and 7, respectively, claims 14 and 15 are not taught or suggested by the Golovatai, Law, and Hussy references for at least the same reasons set forth with respect to claims 6 and 7. Applicants request that the rejection of claims 15 and 16 be withdrawn.

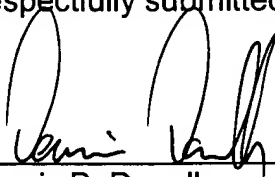
Conclusion

In light of the foregoing, Applicants submit that claims 3, 4, 6, 7, 10, 11 and 13-16 are in condition for allowance and such allowance is respectfully requested. Should the Examiner feel that any unresolved issues remain in this case, the undersigned may be contacted at the telephone number listed below to arrange for an issue resolving conference.

Applicants do not believe that any fee is due at this time. However, the Commissioner is hereby authorized to charge any fee that may have been overlooked to Deposit Account No. 10-0223.

Respectfully submitted,

Dated: 5/24/05



Dennis B. Danella
Reg. No. 46,653

JAECKLE FLEISCHMANN & MUGEL, L.L.P.

190 Linden Oaks

Rochester, New York 14625-2812

Tel: (585) 899.2930

Fax: (585) 899-2931